

---

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**


---

In re application of: Rozbicki et al.

Attorney Docket No.: NOVLP024X2

Patent No.: 7,186,648 B1

Issued: March 6, 2007

Title: BARRIER FIRST METHOD FOR SINGLE  
DAMASCENE TRENCH APPLICATIONS

---

**CERTIFICATE OF MAILING**

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as first-class mail on August 16, 2007 in an envelope addressed to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450.

Signed: \_\_\_\_\_

Aurelia M. Sanchez

**REQUEST FOR CERTIFICATE OF CORRECTION  
OF OFFICE MISTAKE  
(35 U.S.C. §254, 37 CFR §1.322)**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450  
Attn: Certificate of Correction

**Certificate  
AUG 23 2007  
of Correction**

Dear Sir:

Attached is Form PTO-1050 (Certificate of Correction) at least one copy of which is suitable for printing. The errors together with the exact page and line number where the errors are shown correctly in the application file are as follows:

**COVER PAGE:**

1. In the section titled "Related U.S. Application Data" change "application No. 09/965,475" --application No. 09/965,472--. This appears correctly in the Filing Receipt as mailed on June 1, 2004.

**SPECIFICATION:**

1. Column 1, line 13, change "Ser. No. 09/965,475" to --09/965,472--. This appears correctly in the Filing Receipt as mailed on June 1, 2004.

**AUG 23 2007**

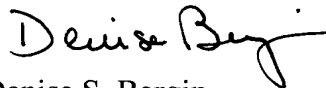
**CLAIMS:**

1. In line 2 of claim 15 (column 14, line 24) change "meal" to --metal--. This appears correctly in Amendment C as filed on August 21, 2006, on page 3, paragraph 6, line 1.

Patentee hereby requests expedited issuance of the Certificate of Correction because the error lies with the Office and because the error is clearly disclosed in the records of the Office. As required for expedited issuance, enclosed is documentation that unequivocally supports the patentee's assertion without needing reference to the patent file wrapper.

It is noted that the above-identified errors were printing errors that apparently occurred during the printing process. Accordingly, it is believed that no fees are due in connection with the filing of this Request for Certificate of Correction. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-0388 (Order No. NOVLP024X2).

Respectfully submitted,  
BEYER WEAVER LLP



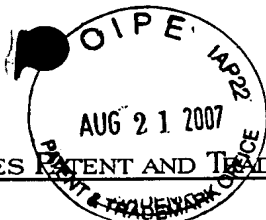
Denise S. Bergin  
Registration No. 50,581

P.O. Box 70250  
Oakland, CA 94612-0250  
408-255-8001

10 23 2007



## UNITED STATES PATENT AND TRADEMARK OFFICE



UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPL NO.   | FILING OR 371<br>(c) DATE | ART UNIT | FIL FEE REC'D | ATTY. DOCKET NO      | DRAWINGS | TOT CLMS | IND CLMS |
|------------|---------------------------|----------|---------------|----------------------|----------|----------|----------|
| 10/804,353 | 03/18/2004                | 2812     | 824           | NOVLP024X2/NVLS-2852 | 5        | 23       | 1        |

CONFIRMATION NO. 9231

022434  
BEYER WEAVER & THOMAS LLP  
P.O. BOX 778  
BERKELEY, CA 94704-0778

## FILING RECEIPT



\*OC000000012826938\*

Date Mailed: 06/01/2004

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections, facsimile number 703-746-9195. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).

## Applicant(s)

Robert Rozbicki, San Francisco, CA;  
Michal Danek, Cupertino, CA;

## Assignment For Published Patent Application

Novellus Systems, Inc.;

## Domestic Priority data as claimed by applicant

This application is a CIP of 10/412,562 04/11/2003  
which is a CIP of 09/965,472 09/26/2001 PAT 6,607,977  
which claims benefit of 60/275,803 03/13/2001  
and said 10/412,562 04/11/2003  
claims benefit of 60/379,874 05/10/2002

## Foreign Applications

If Required, Foreign Filing License Granted: 05/30/2004

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No

*Handwritten signatures and initials:*  
KFW  
JFW/KFW  
JFW/KFW

AUG 23 2007

**Title**

Barrier first method for single damascene trench applications

**Preliminary Class**

438

---

**LICENSE FOR FOREIGN FILING UNDER  
Title 35, United States Code, Section 184  
Title 37, Code of Federal Regulations, 5.11 & 5.15**

**GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Office of Export Administration, Department of Commerce (15 CFR 370.10 (j)); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

AUG 23 2007

10. (Original) The method of claim 4, wherein the substrate is degassed by heating the substrate to between about 150 to 400 degrees Celsius.

11. (Original) The method of claim 1, wherein (a) comprised etching the bottoms of recessed features to a depth of about 20 to 100 Angstroms into the underlying metal.

12. (Original) The method of claim 1, wherein (a) comprises etching under conditions producing an etch-to-deposition ratio ranging between about 1 and 1.5 in field regions of the substrate and an etch-to-deposition ratio ranging between about 1.1 and 3 in the bottoms of the recessed features.

13. (Original) The method of claim 1, wherein (a) comprises depositing the first portion of diffusion barrier elsewhere on the substrate to a thickness of between about 10 and 100 Angstroms on field regions of the substrate and sidewalls of the recessed features.

14. (Original) The method of claim 1, wherein (b) comprises depositing the second portion of diffusion barrier to a thickness of at least about 5 Angstroms on the bottoms of the recessed features.

15. (Original) The method of claim 1, wherein (a) comprises sputtering a metal from a target having an applied DC power of between about 1 and 10 kW and biasing the substrate with about 200 to 2000 W of RF power.

16. (Original) The method of claim 1, wherein (b) comprises using chemical vapor deposition (CVD), physical vapor deposition (PVD), atomic layer deposition (ALD), or pulsed deposition layer (PDL).

17. (Original) The method of claim 1, wherein at least one portion of the diffusion barrier comprises a material selected from the group consisting of tantalum, nitrogen-doped tantalum, tantalum nitride, titanium nitride, tungsten nitride, ruthenium, and silicon containing versions of any of these.

18. (Original) The method of claim 1, wherein (a) comprises sputtering a metal from a target having an applied DC power of between about 1 and 30 kW, while applying a bias to the substrate.

19. (Original) The method of claim 18, wherein the bias comprises RF power of between about 100 and 2000 W.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB Control number

(Also Form PT-1050)

## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO. : 7,186,648 B1

Page 1 of 1

DATED : March 6, 2007

INVENTOR(S) : Rozbicki et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

### In the Cover Page:

In the section titled "Related U.S. Application Data" change "application No. 09/965,475" -- application No. 09/965,472--.

### In the Specification:

Column 1, line 13, change "Ser. No. 09/965,475" to --09/965,472--.

### In the Claims:

In line 2 of claim 15 (column 14, line 24) change "meal" to --metal--.

MAILING ADDRESS OF SENDER:

PATENT NO. 7,186,648 B1

**Denise S. Bergin**  
BEYER WEAVER LLP  
P.O. Box 70250  
Oakland, CA 94612-0250

No. of Additional Copies

1

Burden Hour Statement: This form is estimated to take 1.0 hour to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.